Fire Program Analysis – Preparedness Module

Fire Management Units

September 7, 2004

Issue: Guidance for Fire Management Unit (FMU) Development in relation to FPA-PM[1] Implementation

Recommendations:

1. Field units should continue developing FMUs based on Land Management Plan direction. For example:
    a. Desired landscape conditions
    b. Strategies to manage fire
    c. Post-fire restoration strategies
    d. Fuels management strategies
2. FMU objectives may include other management issues or values at risk such as Wildland Urban Interface and community protection, commodity values, cultural resources, and natural resource values.
3. FMUs should also consider key attributes important to FPA-PM. These include access, workload points, and topographic features.
4. The Interagency Fire Management Plan (FMP) Template should be amended to incorporate FPA-PM requirements in FMU criteria.
5. Plan for future FMU development guidance to eliminate the distinction between FMP and FPA FMUs. Set the expectation that the process is dynamic, and that some changes to FMUs may be required in the future as fire planning needs – including those generated by FPA - mature.

Background:

The primary purpose of developing FMUs in fire management planning is to assist in organizing information about complex landscapes. Once created, FMUs have both strategic and tactical utility. From a strategic standpoint, FMUs allow managers and planners to specify general land management direction and set overall fire management objectives for a parcel of land. This information can be used to analyze the impacts of various approaches to management. FMUs also perform tactical functions and are used to organize the dispatch of fire resources and perform other operational functions.

The Fire Program Analysis (FPA) uses the definition of Fire Management Units (FMUs) included in the interagency fire management planning guidance to create polygons to model in FPA-PM. However the FPA project has identified several attributes necessary to running the FPA analysis that may not have been emphasized or considered in defining FMUs in many fire management plans. This paper attempts to underscore those needs and suggest a process for land management units to build on existing planning to define, or redefine fire management units as needed.

[1] http://fpa.nifc.gov

As implementation of FPA-PM continues, it's clear that additional criteria need to be considered in the development of fire management units (FMUs). These additional criteria may contribute to more detailed FMU development than what is currently indicated in the Interagency Template FMU definition. Spatial delineation of FMUs in the fire management plan generates broad polygons whose boundaries are driven by commonality in land management plan direction and objectives.

Current definition for FMUs (Interagency FMP Template) developed in Fire Management Plans is as follows:

> "An FMU is any land management area definable by objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, and so on, that set it apart from the management characteristics of an adjacent unit. The development of FMUs should avoid redundancy. Each FMU should be unique as evidenced by management strategies, objectives, and attributes. Management area standards and guides found in an agency's land and resource management plan are factors to be considered in developing management goals and objectives. The FMUs may have dominant management objectives (such as wildland urban interface protection issues) and pre-selected strategies assigned to accomplish these objectives."

To accommodate the needs of FPA-PM, additional criteria are required. For FPA to model initial response, local unit staff needs to answer the following questions:

- **What is the relationship between the 'workload point' needed for modeling in FPA and existing FMUs?**

  Within FPA, the 'workload point' is used to calculate estimated travel times between dispatch locations and each FMU. Workload points are determined based on the location of historic ignitions within the FMU. At the moment, each FMU has a single workload point to calculate representative travel times.

  In some cases, land management objectives in the FMP may provide sufficient direction and enough information for existing land management plan FMUs to be used as inputs to FPA. This is typically when travel times from Dispatch Locations to the workload point within the FMU are representative of the average response times of that FMU area. If the FMU is non-contiguous, it is possible that the workload point will be a calculated point located between non-contiguous FMU polygons.

  If the representative travel times can be sufficiently represented by the single workload point, then existing FMUs may be adequate in this regard. However, if a single workload point for existing FMUs does not appear to adequately represent the situation, then FMUs based on land management plan direction may need to be further subdivided. The FPA project is considering the capability of multiple workload points for each FMU, but this feature will likely not be a part of the first release of the analysis software,

  FMUs may also require some additional re-definition based on other criteria that includes access, topography, watershed delineation, and identification of resource values of concern.

(These criteria are outlined in Stage III of FMU development discussed below).

- **What is the relationship between accessibility (i.e. equipment transport) and types of fire resources used by FPA in initial response modeling?**

  FPA-PM currently allows the fire planner to designate the percentage of the FMU for which water production rates for engines are applicable. This would include engines that may approach close enough to (x) percentage of fires to either contain or extinguish those fires. A "walk-in" delay will be applied to the remaining percentage of ignitions within the FMU. Walk-in delays represent the time required to get from the termination point of mechanical transport to the fire by walking.

Specific direction on how to consider these additional criteria for FMU development for FPA-PM has not been consistent, and there is confusion as to whether these additional polygons should be called FMUs. Clearly, field units are ready for specific guidance on this issue, and it is imperative that the FPA Core Team, the FPA Implementation Group, and National Agency Fire Planners come to agreement on this issue.

Discussion:

FMU development in the Fire Management Plan is primarily defined by objectives presented in the agencies' respective land management plans, standards, and guides. These land management objectives provide a fundamental first step in understanding how fire may be managed on the landscape and drive the initial development of FMUs. Based on the land management objectives, FMUs determine the appropriate fire management strategies and establish specific fire management objectives that support land management objectives.

In the interim, as FPA and fire management planning that supports FPA evolve, the process for defining Fire Management Units will continue to be clarified. The goal is to develop FMUs in the fire planning process that both reflect land management plan direction and meet the needs of evolving fire planning requirements – including those generated by FPA.

Proposed FMU Development Process

The Southern Sierra and Alaska Prototypes have implemented a process of FMU development that can be articulated as a hierarchy of stages. These different 'stages' can be viewed as the application of successive filters – coarse scale to fine scale (or applying general to specific criteria) – as a process of defining FMU boundaries. This process utilizes the FMU development direction defined in the existing Interagency FMP Template. It also considers the additional criteria needed for initial response modeling for FPA-PM. This process has emerged as a potential scenario for FMU development that accomplishes the following:

1. It builds upon FMU work already developed in existing FMPs.
2. It identifies additional criteria to be used to further define FMUs for FPA-PM.

It should be noted that, while the stages below are described as distinct steps for clarity, they may also be implemented as a single process that considers all three 'stages' at once. Also, many fire management plans have already incorporated two or more of the 'stages' in their existing planning and the unit's existing FMUs may reflect all of the considerations defined below.

Stage I: Land Management Plan FMUs (Figure 1.)
This is FMU delineation based on broad land management direction and allocation. Example criteria:

- Identified Wildland Fire Use opportunities across the landscape.
- Identified areas where Suppression is the primary objective/strategy.
- Defined areas where Landscape Condition is the primary objective or where ecological objectives are most important.

Stage II: Additional Management Considerations (Figures 2 and 3.)
These could be values at risk and other constraints or management considerations often found in agency specific management direction or policy statements. These natural resource, cultural and social values and management considerations would contribute significantly in the weighting process in FPA implementation. Examples of these considerations include:

- WUI
- Old Growth
- Cultural Values
- Habitat…

Stage III: Initial Response (Figure 4.)
Building upon Stage I and Stage II criteria, these additional criteria address the specific needs of FPA-PM.

- Access issues
- Topographic features, such as watershed delineation

As FPA evolves in the next few years, additional direction may be developed for refining FMUs based on further needs in the analysis. However, field units that are currently involved in developing fire management plans should not postpone developing FMUs in anticipation of this direction. Field units should proceed with developing FMUs based on land management objectives, and incorporate additional criteria that define initial attack responses.

Southern Sierra Prototype FPU with Response Areas

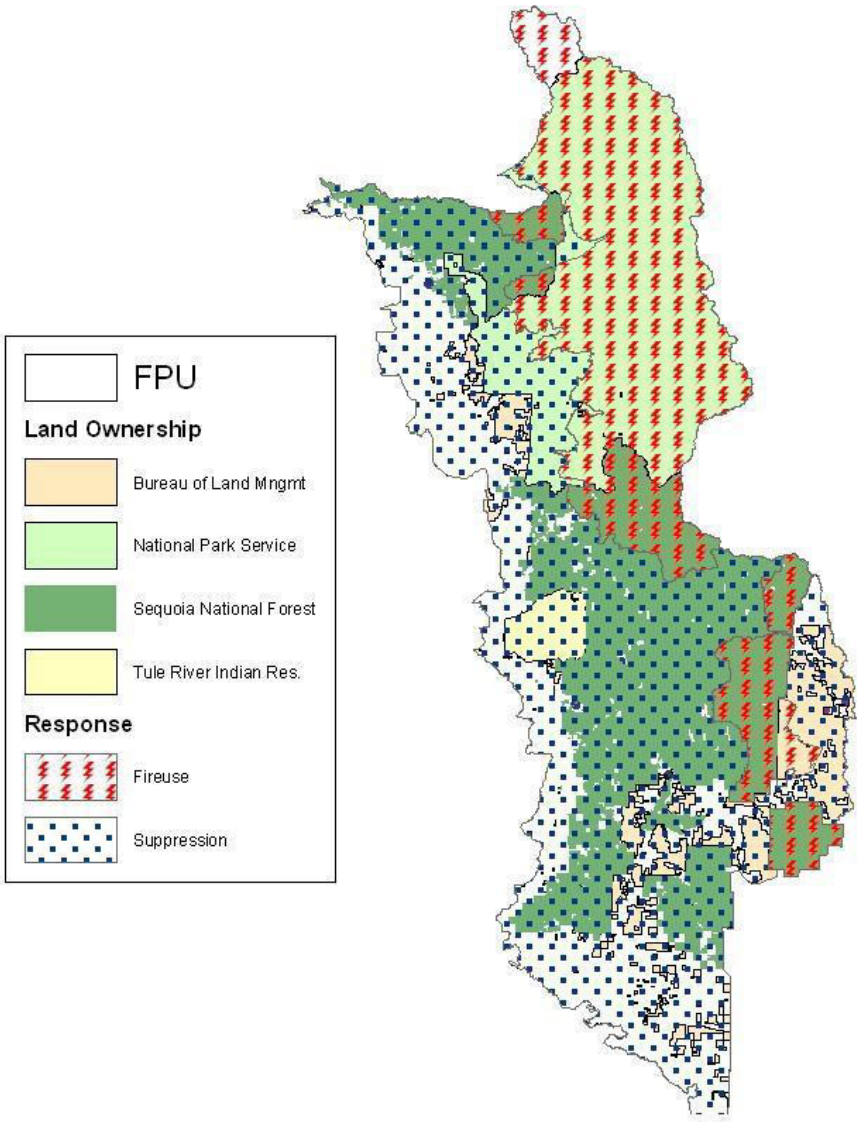

Figure 1. Stage 1: Delineating response areas.

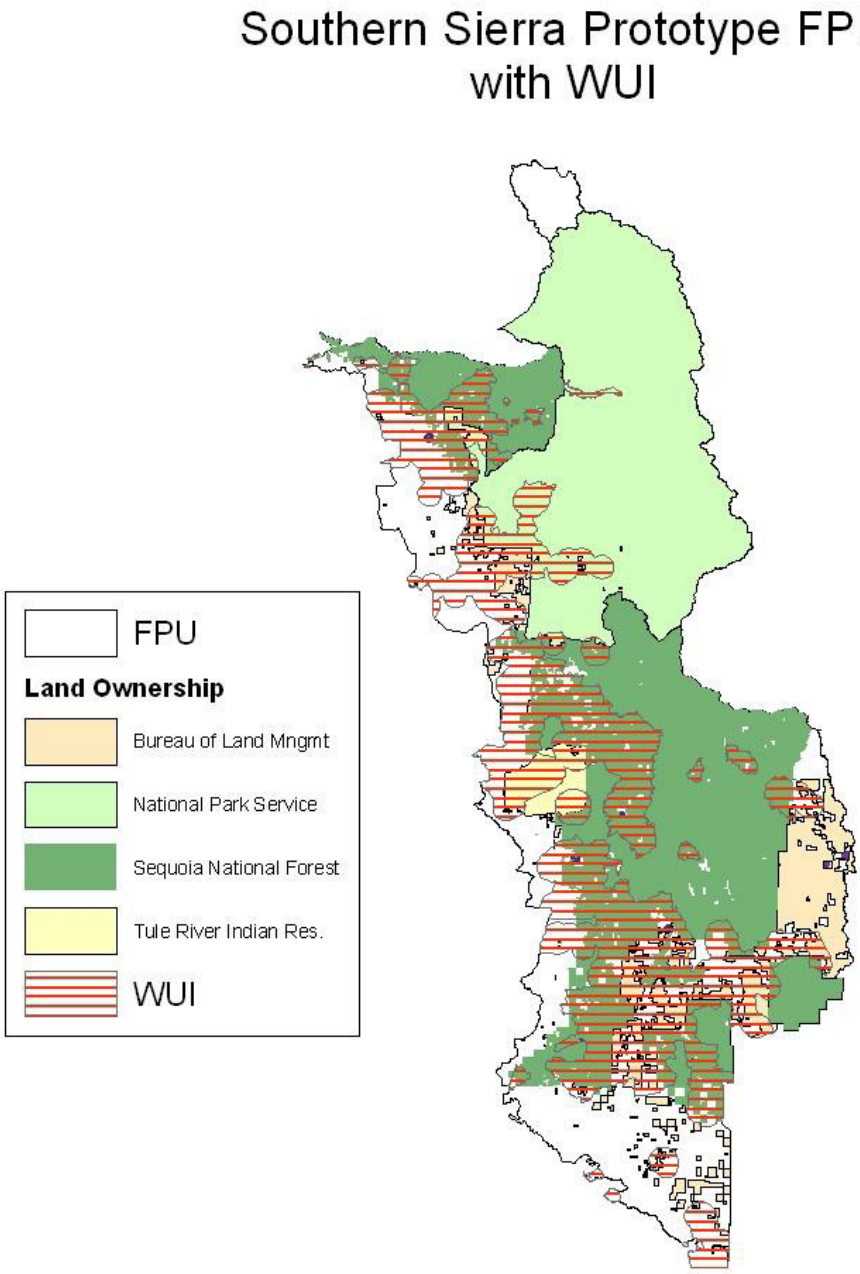

Figure 2. Stage II: Delineating WUI regions.

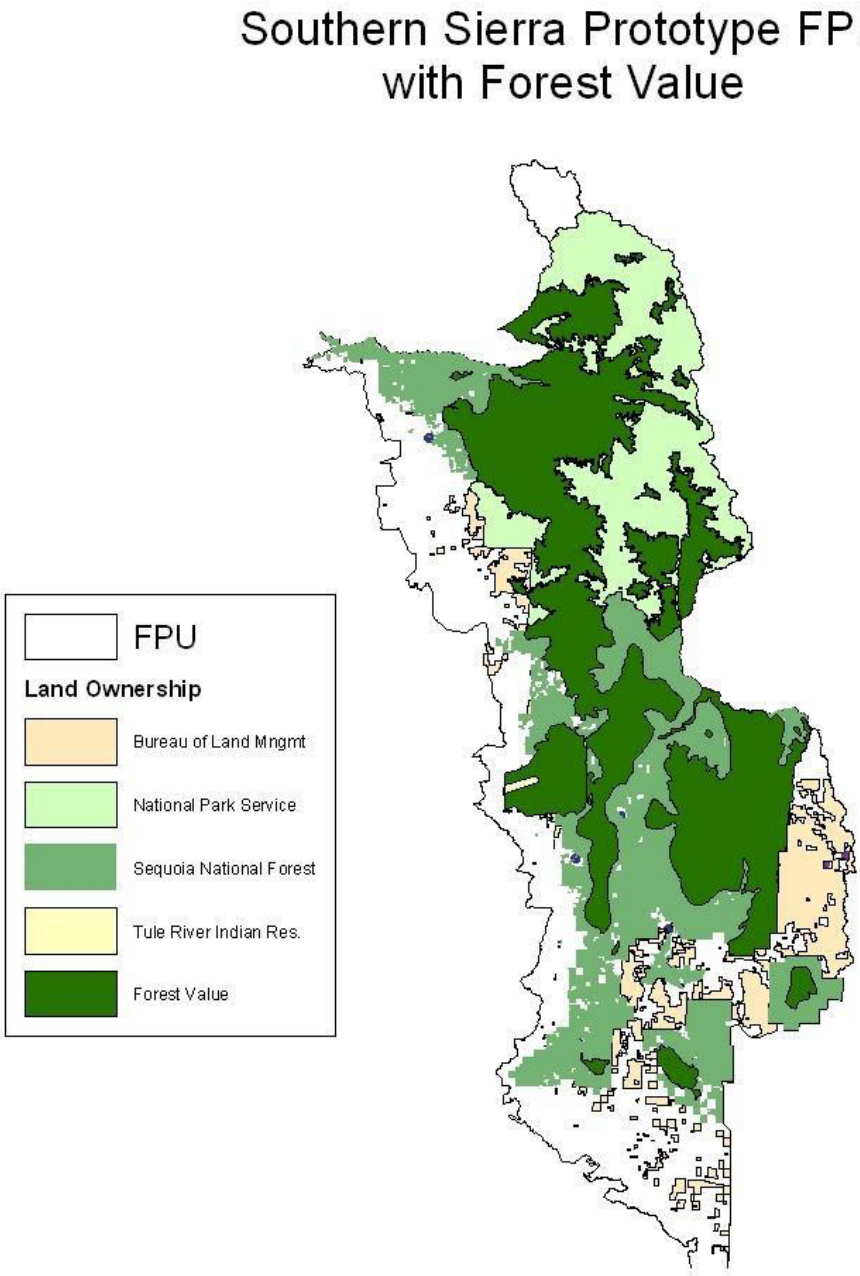

Figure 3. Stage II: Delineating forest value criteria.

Southern Sierra Prototype FPU with FMUs

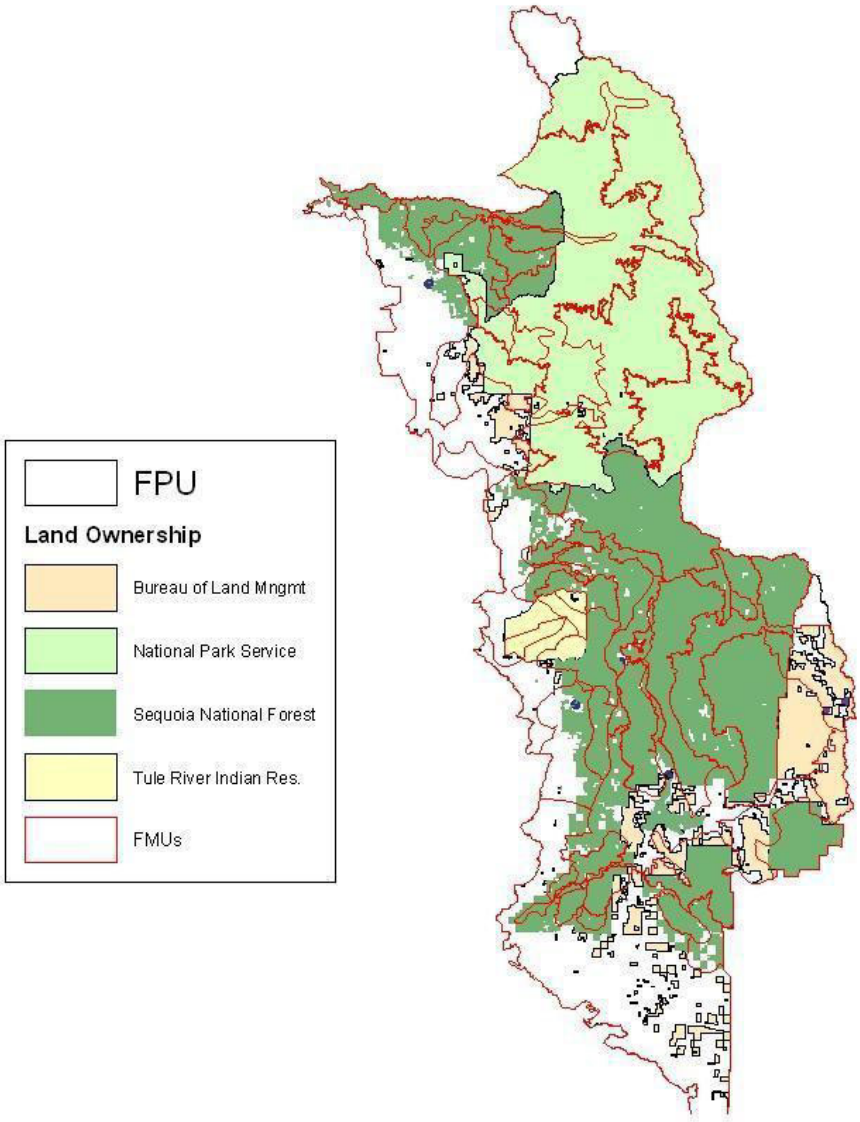

Figure 4. Stage III: FMUs developed from FPA criteria.